

## **Well-structured problems for multiplication and division**

### **Grouping problems**

How many peanuts would the monkey eat if she ate 4 groups of peanuts with 3 peanuts in each group?

The monkey ate 4 bags of peanuts. Each bag had the same number of peanuts in it. If the monkey ate 12 peanuts all together, how many peanuts were in each bag? (how many in each group?)

The monkey ate some bags of peanuts. Each bag had 3 peanuts in it. Altogether the monkey ate 12 peanuts. How many bags of peanuts did the monkey eat? (how many groups?)

### **Rate problems**

A baby elephant gains 4 pounds each day. How many pounds will the baby elephant gain in 8 days?

A baby elephant gains 4 pounds each day. How many days will it take the baby elephant to gain 32 pounds?

A baby elephant gained 32 pounds in 8 days. If she gained the same amount of weight each day, how much did she gain in one day?

### **Price problems**

How much would 5 pieces of bubble gum cost if each piece costs 4 cents?

If you bought 5 pieces of bubble gum for 20 cents, how much would each piece cost?

If one piece of bubble gum costs 4 cents, how many can you buy for 20 cents?

### **Multiplicative comparison problems**

The first-grade class has a hamster and a gerbil. The hamster weighs 3 times as much as the gerbil. The gerbil weighs 9 ounces. How much does the hamster weigh?

### **Array and Area problems (symmetric problems)**

Array problems help children understand that multiplication is commutative.

For the second grade play, the chairs have been put into 4 rows with 6 chairs in each row. How many chairs have been put out for the play?

(The monkey problem above is not solved with an array naturally, even though many books use arrays to show all kinds of grouping problems.)

Area problems provide a basis for understanding multiplication and division of fractions.

A baker has a pan of fudge that measures 8 inches on one side and 9 inches on another side. If the fudge is cut into square pieces 1 inch on each side, how many pieces of fudge does the pan hold?

### **Combination problems**

The Friendly Old Ice Cream Shop has 3 types of ice cream cones. They also have 4 flavors of ice cream. How many different combinations of an ice cream flavor and cone type can you get at the Friendly Old Ice Cream Shop?

## **Types of division problems**

### **Partitive division problems**

You have 24 cookies and want to share them equally with 6 people. How many cookies would each person get?  $24 \div 6 = 4$  cookies

40 marbles are divided equally among 8 friends. How many marbles does each friend get?

You are reading a book with 120 pages. If you want to read the same number of pages each night, how many would you have to read each night to finish in 10 days?  $120 \div 10 = 12$  pages (sharing the pages equally among the nights)

A class is taking a field trip. There are 30 students in the class. 6 parents volunteer to drive. How many students have to fit in each car? (sharing the students equally among the cars)

### **Measurement division problems**

A cereal box holds 18 cups of cereal. Each serving is 2 cups. How many servings are in the whole box?  $18 \div 2 = 9$  servings (The question can be restated as “How many times does 2 go into 18?”)

An airplane hangar is 300 feet long. How many planes can fit into it, end to end, if each plane is 50 feet long?  $300 \div 50 = 6$  planes

A box of books weighs 42 pounds. Each book weighs 3 pounds. How many books are there in the box?  $42 \div 3 = 14$  books (How many things of 3 pounds each are there in 42 pounds?)

Sue’s mother made 75 cookies. She put the cookies in bags, with 3 cookies in each bag. How many bags could she fill up?

## **Remainder problems**

### **The remainder means an extra is needed**

20 people are going to a movie. 6 people can ride in each car. How many cars are needed to get all 20 people to the movie?

### **The remainder is simply left over and not taken into account (ignored)**

It takes 3 eggs to make a cake. How many cakes can you make with 17 eggs?

### **The remainder is the answer to the problem**

Ms. Baker has 17 cupcakes. She wants to share them equally among her 3 children so that no one gets more than anyone else. If she gives each child as many cupcakes as possible, how many cupcakes will be left over for Ms. Baker to eat?

### **The answer includes a fractional part**

9 cookies are being shared equally among 4 people. How much does each person get?

Problems need to be used over and over to develop meaning of remainders. Develop meaning for the shift from remainders to fractional parts.